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SUBSTITUTE
REMPLACEMENT

SECTION is not Present
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ABSTRACT OF THE DISCLOSURE

Disclosed is a plastic plug for temporarily closing unused tapped holes in automobile vehicles, for example, bolt holes for securing seat belts. The plug comprises a thin walled shank and an umbrella-like head. There is a central or cross slot in the head whereby the plug, which may be driven into a hole, and may also be screwed into the hole. The thin walled plastic shank accommodates the intense threads of the hole. The plastic character of the plug and the slotted head permit the disengagement of the plug from the threaded hole simply by unscrewing it with a suitable tool.

1 This invention relates to a hole plug of plastic
for closing temporarily unused tabed holes, in particular
in automotive vehicles, including a tubular smooth thin-
walled shank to be driven in or to be screwed into the
5 tabed hole or to be screwed out of it and an adjacent
head superimposing the work panel aperture umbrella-like
including a central slot or cross slot to apply a tool.

Such hole plugs which are preferably made of poly-
amid or similar soft resilient plastics in particular
10 serve to temporarily cover tabed holes which are provided
in automotive vehicles for the later attachment of the
securing means of safety belts. So that no water or dirt
is able to enter these tabed holes as long as the buyer
of the automotive vehicle does not have a safety belt
15 attached, they are closed by hole plugs of the mentioned
type.

In the simplest case these hole plugs the shank of
which for doing so preferably is slightly tapered at its
free end are struck into the tabed hole; but they can
20 also be screwed in. After inserting the hole plug the
shank of which is dimensioned a little larger than the
inner diameter of the threaded bore, the thin-walled
shank is urged outwardly slightly into the thread con-
volutions and thereby retains the hole plug secured in
25 the threaded bore. The plug can then be removed again
in that a screwdriver is inserted in the slot or cross
slot in the head and the hole plug is screwed out. This
slot or cross slot of course is formed as a blind hole



1 in order to prevent the passing through of humidity and dirt.

The head formed umbrella-like is formed slightly conical in this inventional hole plug and engages the surface of the margins of the tabed hole in being resiliently biased upon striking-in the hole plug. A comparatively good sealing effect is achieved thereby.

But the following disadvantage of the conventional hole plugs has been noted:

10 When there is humidity on the face of the work panel or the like facing the free shank end, it can after some time penetrate in direction to the head and results in rust there through the tips of the threaded convolutions which are generally not completely filled by the material of the shank. The conventional hole plugs thus offer no protection against the intrusion of water from this side.

The invention is based on the problem of developing the conventional hole plugs so further that water intruding the threaded convolutions of the threaded bore between it and the shank is not able to pass on to the top side of the work panel at the end of the threaded bore.

The invention resides in the measure that an annular bead extends outwardly at the junction between the hollow shank and the head, said annular bead upon striking-in of the hole plug engaging the top side of the work panel provided with the threaded bore and thereby causing a reliable sealing effect.

The hole plug of this invention can be particularly

1 well used for sealing a nut welded underneath an apertured
sheet-metal plate. The smooth bore in the metal plate
supporting the nut then of course is a little larger
5 and permits the insertion of the annular bead of this
invention which then engages the top side of the nut at
the beginning of the thread convolutions.

The spacing of this annular bead from the bottom
side of the head or the height of the head in this regard
10 are of course dimensioned in such a way that the annular
bead as well as the umbrella-like head both engage the
surface contacted thereby under a resilient bias.

The cross section of the annular bead in this re-
gard depends on the respective use and is either rectangular
15 or triangular, but it may also be trapezoidal or also semi-
circular. Generally a cross section will be preferred
having an abutment surface which is disposed in a radial
plane in relationship to the axis of the hole plug be-
cause thereby an optimum sealing effect is accomplished.
20 But in case the entry of the threaded bore is counter-
sunk slightly, like this is for instance generally the
case for nuts, an annular bead can also be preferred
having an inclined abutment surface, or an annular bead
can be preferred having a semi-circular cross section.

25 The invention is explained in closer detail herein-
after in referring to the drawing in embodiments. Therein:

1 Fig. 1 is a cross sectional view of a hole
plug of this invention,

Fig. 2 is a sectional view of the hole plug
according to Fig. 1 screwed into a work panel arrangement,

5 Fig. 3 to Fig. 6 are partial sectional views of the
hole plug illustrating various cross sectional shapes of
the annular bead, shown with Fig. 1.

The hole plug illustrated in Fig. 1 includes a smooth
thin tubular shank 2 which is tapered at its free end
10 outwardly, and a substantially solid head 1 adjacent
thereto provided with a cross slot 3 and a thin umbrella-
like flange 4 extending outwardly. An annular bead 5 is
provided at the junction between the shank and the head.

As will be noted from Fig. 2, the tips of the threads
15 of a nut 8 into which the hole plug has been struck-in
press themselves into the outer periphery of the thin shank
2 and thereby retain the hole plug secured in the opening.
A more or less large channel 9 does remain between the
shank 2 and the nut 8, however, in the thread convolutions,
20 which permits the passage of water.

In the instant embodiment which involves a securing
device for a safety belt in an automotive vehicle, the nut
8 illustrated in Fig. 2 is welded to a thicker metal sheet
7 at the bottom side which has a bore the diameter of
25 which is slightly larger than the outer diameter of the
threaded bore of the nut 8.

The thicker metal sheet 7 again is welded to the thin
body sheet 6.

Upon striking-in the hole plug the annular bead 5 engages the top side of the nut 8 projecting beyond the inner margins of the bore in the sheet 7 and thereby seals the channel 9 in direction to the sheets 6 and 7 reliably. At the same time the umbrella-like flange 4 has been deformed in the illustrated way upon striking-in the hole plug, and it now engages the body sheet 6 under a bias so that a sealing against humidity is also accomplished from this side.

10 In Fig. 3 to 6 the detail denominated K in Fig. 1 has been illustrated in an enlarged scale, but showing different cross sectional shapes of the annular bead. The umbrella-like annular bead 5a illustrated in Fig. 3 is formed similar to the umbrella-like flange 4 at the head of the hole plug, and it engages the surface of the work panel provided with a threaded bore in being resiliently deflected when the hole plug is struck in. The sectional shapes 5b, 5c and 5d of the annular bead
20 illustrated in Fig. 4 to 6 are used depending on the particular use for which the hole plug is intended.

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The embodiments of the invention in which an exclusive property or privilege is defined are claimed as follows:

1. Hole plug of plastic for sealing temporarily unused threaded holes, in particular in automotive vehicles, including a tubular smooth thin-walled shank to be driven-in or to be screwed into the threaded hole or to be screwed out of it and a head adjacent to the shank superimposing the hole umbrella-like and having a central slot or a cross slot for applying a tool, characterized in that an annular bead extends outwardly at the junction of the shank with the head.



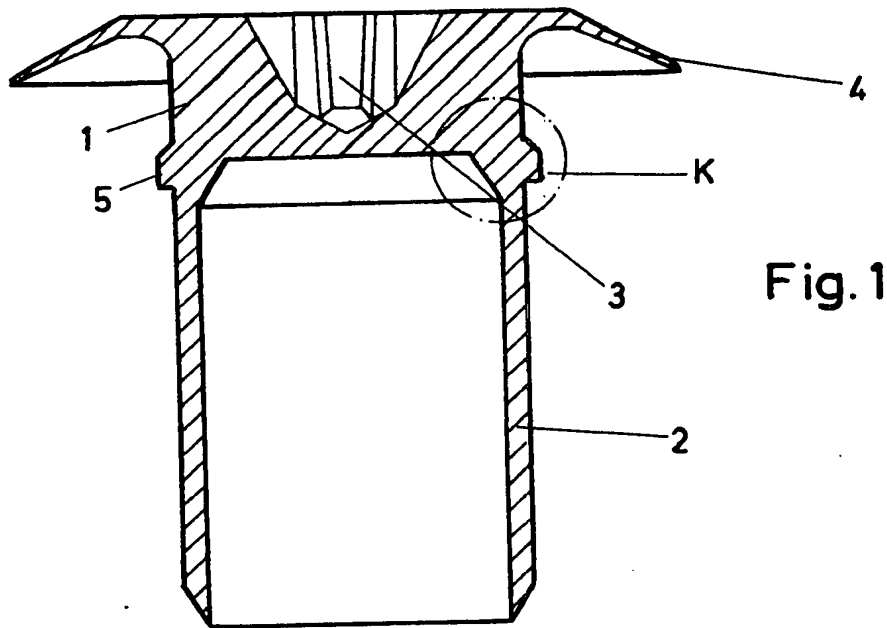


Fig. 1

Fig. 3

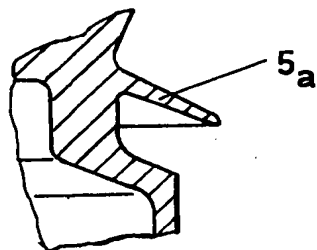


Fig. 4

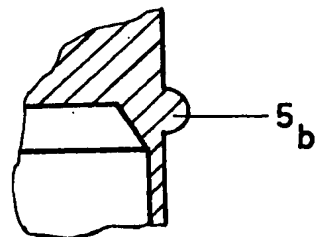


Fig. 5

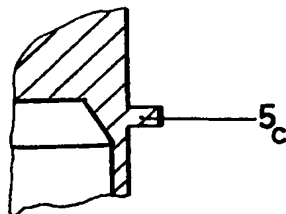
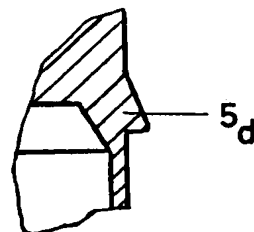


Fig. 6



INVENTOR
GUNTER HARALD WILBROW
Meredith & Finlayson
PATENT AGENTS

Technical drawing of a mechanical assembly in cross-section. The assembly consists of a central shaft (2) with a key (9) and a pulley (1) mounted on it. The pulley is secured by a nut (6) and a washer (4) on the left, and a nut (5) and a washer (7) on the right. The shaft is supported by bearings (8) on both sides.

GUNTER HARALD WIBROW
Meredith & Finlayson
PATENT AGENTS